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(71)Applicant : TOSHIBA CORP

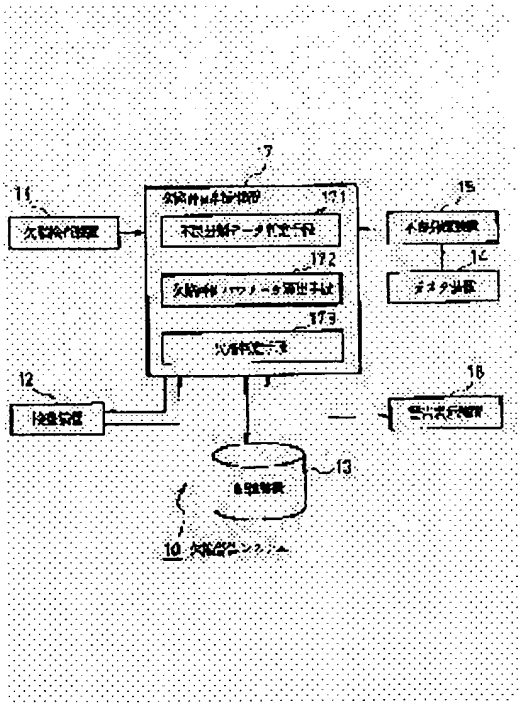
(72)Inventor : MATSUO TSUKASA

(54) METHOD AND SYSTEM FOR ALARMING DEFECT

(57)Abstract:

PROBLEM TO BE SOLVED: To quickly and accurately enable an operator to decide continuation of manufacturing and the like in manufacturing a semiconductor device.

SOLUTION: The defect data detected by a defect inspecting apparatus 11 and the defect cause classified in an inspecting apparatus 12 are stored with relations to a memory device 13. When defect position contained in the defect classification data formed in an out of specification classifying device 15 agrees with the defect position contained in the defect data, an out of specification classified-data decision means 171 stores the out of specification classified data in relation to the defect data. A defect-evaluation-parameter computing means 172 computes the occurrence rate of the defects at the same position, based on the data and the out of specification classification data. A defect decision means 713 issues an alarm via an alarm display device 16, when computed defect occurring rate exceeds the specified reference.



DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] This invention relates to the defective warning method and defective warning system which enabled it to judge continuation of manufacture of a lot etc. quickly and correctly by emitting warning according to the incidence rate of a defect in the manufacturing process of a semiconductor device.
[0002]
[Description of the Prior Art] Semiconductor devices, such as LSI, repeat processing of oxide-film generation, exposure (development ****), etching, an ion implantation, thermal diffusion, etc. on a silicon wafer base, perform it, and are completed by generating an electronic circuitry on a wafer front face. Such a series of processings are performed in the lot unit which uses two or more wafers as one lot, and when each lot flows a line top, each processing is carried out one by one. In the site of the conventional semiconductor manufacture, that defective inspection was conducted how many times into the manufacturing process, the inspection result was analyzed, and when the lot which the defect exceeding a criterion generated is found, the measures of excepting from a line at the time are taken.
[0003] After the conventional defective analysis carries out defective inspection using defective test equipment and acquires defective data to all the wafers of the lot in fixed frequency or the process specified arbitrarily, it performs the factor classification of a defect based on the acquired defective data (especially defective position data) with the test equipment mentioned later. The classification division of the cause about the defect by which change is regarded as the defective factor classification in this case physically and chemically is carried out, and an operator classifies a thing similar to the factor classification of the defect beforehand set up based on the photograph of a defect generated in the past. Test equipment, such as a review station or SEM (scanning electron microscope), is used for this classification. And the process engineer judged the continuation of manufacture of a lot etc. from the past example based on the defective data obtained from a defective factor classification (henceforth a defective factor), and defective test equipment.
[0004]
[Problem(s) to be Solved by the Invention] In the conventional defective analysis, as mentioned above, since all the judgment was made artificially, ambiguity, i.e., individual differences, arose in the result, and suitable measures might be unable to be taken. Moreover, if judgment takes time, in order that the lot which does not become a product might flow a line top in the meantime, when the man day of the part became useless and a problem was in a manufacturing installation, the lot with the same defect had produced the problem of being generated one after another. Thus, in the conventional artificial judgment, there was a trouble that it became impossible to take suitable measures and the yield of a product fell from the delay of a cure.
[0005] In the manufacturing process of a semiconductor device, this invention emits warning, when a defect which causes the fall of the yield occurs, and it aims at offering the defective warning method and defective warning system which enabled it to implement a subsequent cure quickly and correctly.
[0006]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention of a claim 1

The defective data of the inspected object which was used for a series of manufacturing processes which generate the wafer as an inspected object, and was detected with defective test equipment, In the defective warning method of performing the defective judging to the aforementioned inspected object based on the defective factor of the object-ed classified based on these defective data The positional information which associates and memorizes the aforementioned defective data and the defective factor corresponding to this, generates poor classification data based on the fail bit generated in the aforementioned inspected object, and is contained in these poor classification data, When the positional information contained in the aforementioned defective data is in agreement in the same position of an inspected lifter When relate the poor classification data with the aforementioned defective data, it is memorized, the incidence rate of the defect in the same position is calculated based on the aforementioned defective data and poor classification data and the incidence rate of this defect exceeds a predetermined criterion, it is characterized by emitting warning.

[0007] invention of a claim 2 -- the defective warning method of a claim 1 -- setting -- the same position as the incidence rate of the defect in the same position -- and the same position as the incidence rate of the defect of the same size and the same size -- and when the incidence rate of the defect of the same defective factor is calculated and any one of the incidence rates of these defects exceeds a criterion, it is characterized by emitting warning

[0008] In order to attain the above-mentioned purpose, moreover, invention of a claim 3 A defective inspection means to detect the defective data of an inspected object, and the inspection means for classifying the defective factor of an inspected object based on the aforementioned defective data, A storage means to associate and memorize the aforementioned defective data and other data, and a poor classification data generation means to generate poor classification data based on the fail bit data acquired from the aforementioned inspected object, When the positional information contained in the aforementioned poor classification data and the positional information contained in the aforementioned defective data are in agreement in the same position of an inspected lifter A poor classification data judging means to relate the poor classification data with the corresponding defective data, and to make it memorize, When an incidence-rate calculation means to calculate the incidence rate of the defect in the same position is compared with the incidence rate and criterion of a defect by which calculation was carried out [aforementioned] based on the aforementioned defective data and poor classification data and the incidence rate of a defect exceeds a criterion, it is characterized by having the defective judging means which emits warning.

[0009] invention of a claim 4 -- a claim 3 -- setting -- the aforementioned incidence-rate calculation means -- the same position as the incidence rate of the defect in the same position -- and the same position as the incidence rate of the defect of the same size and the same size -- and when the incidence rate of the defect of the same defective factor is calculated and any one of the incidence rates of these defects exceeds [the aforementioned defective judging means] a criterion, it is characterized by to be what emits warning

[0010]

[Embodiments of the Invention] 1 operation gestalt at the time of applying the defective warning method and defective warning system concerning this invention to the defective warning system used for the manufacturing process of a semiconductor device hereafter is explained.

[0011] Drawing 1 is the block diagram showing the whole defective warning system composition concerning this operation gestalt. This defective warning system 10 is constituted by defective test equipment 11, test equipment 12, storage 13, circuit tester equipment 14, poor classification equipment 15, alarm display equipment 16, and defective evaluation judging equipment 17.

[0012] In the defective inspection process mentioned later, defective test equipment 11 is equipment which inspects the defect on a wafer, inspects the number of defects, a defective position (Xpi, Ypi), defective size (delta Xsi, delta Ysi), etc., and acquires these data as defective data. This defective data is sent to storage 13 through defective evaluation judging equipment 17.

[0013] Test equipment 12 is constituted by a review station or SEM, and is displayed on the display unit which does not illustrate the image data of each defect based on the data of a defective position

incorporated by the aforementioned defective test equipment 11. Here, the classification of a defective factor is performed by the operator. The defective factor which it is as a result of a classification is sent to storage 13 through defective evaluation judging equipment 17. In addition, a defective factor will be acquired by the improvement in functional of defective test equipment 11, and will acquire a defective factor from defective test equipment 11 in this case.

[0014] Storage 13 is equipped with the data structure as a database, associates this defective data and data, such as a defective factor sent from test equipment 12, poor classification data mentioned later, and additional information, respectively, and registers them while it registers the defective data sent from defective test equipment 11. In addition, processing of acceptance of various data, registration, ejection, etc. is controlled by the database management system which is not illustrated.

[0015] In the test process mentioned later, circuit tester equipment 14 is equipment which tests the electrical property of each chip formed on the wafer etc., and acquires the fail bit data for every wafer as a test result. Fail bit data are data showing the quality of the bit data of the portion which the defect produced in electrical property. This fail bit data is sent to poor classification equipment 15.

[0016] Poor classification equipment 15 analyzes the fail bit data sent from the aforementioned circuit tester equipment 14, classifies a poor kind from the generating pattern of a fail bit, and acquires poor classification data. The poor position (Xj, Yj) expressed with the same system of coordinates as the defective position (Xpi, Ypi) mentioned above is added to this poor classification data, and it is sent to defective evaluation judging equipment 17 like defective data.

[0017] Alarm display equipment 16 is constituted by output devices, such as a display unit and printer equipment, and when the defective evaluation parameter mentioned later exceeds a criterion, it emits warning by the message, alarm, etc. to an operator.

[0018] Defective evaluation judging equipment 17 is equipment which performs a defective judging based on this defective evaluation parameter and criterion, and is constituted by the poor classification data judging means 171, the defective evaluation parameter calculation means 172, and the defective judging means 173 while it calculates the defective evaluation parameter mentioned later.

[0019] The poor classification data judging means 171 is set under the condition of the same product, the same lot, and the same wafer. The poor position included in the poor classification data incorporated from poor classification equipment 15 (Xj, Yj), When the defective position (Xpi, Ypi) included in defective data is compared and these are in agreement within the same position or tolerance (henceforth the same position), the poor classification data is related with the defective data with which storage 13 corresponds, and is made to register.

[0020] The defective evaluation parameter calculation means 172 calculates the incidence rate of a defect as a defective evaluation parameter for every product and process based on defective data, poor classification data, and a defective factor. Here, a defective evaluation parameter is calculated according to a defective position, defective size, and a defective factor. That is, it is a defective position evaluation parameter and the same position about the incidence rate of the defect in the same position on a wafer, and is a defective size evaluation parameter, the same position, and the same size about the incidence rate of the defect of the same size, and the incidence rate of the defect of the same defective factor is calculated as a defective factor parameter, respectively. In addition, a defective evaluation parameter is calculated when the test process which the lot which is a batch mentions later is reached.

[0021] The defective judging means 173 emits warning through alarm display equipment 16, when each defective evaluation parameter and criterion which were calculated with the defective evaluation parameter calculation means 172 are compared and any one of the aforementioned parameters exceeds a criterion.

[0022] Here, input devices, such as a keyboard which is not illustrated, a mouse, a light pen, or flexible disk equipment, are connected to defective evaluation judging equipment 17, and various kinds of instructions, data, etc. are inputted into it. Moreover, storage 13, poor classification equipment 15, and defective evaluation judging equipment 17 are constituted by the usual computer system containing storage, such as CPU for performing various kinds of processings, ROM for memorizing an instruction of this processing, data, etc., RAM, and a magnetic disk.

[0023] Drawing 2 is a thing showing the manufacturing process of a semiconductor device, and is explanatory drawing which listed from a wafer injection to completion in the wafer state in the unit called process especially. The process name and the operation number are given to each process, respectively. Here, operation numbers 1, 2, 4, and 5 etc. express manufacturing processes by which repeat operation is carried out, such as oxide-film generation and exposure, and operation numbers 3, 6, and 10 etc. express the defective inspection process which acquires defective data with defective test equipment 11. Moreover, the operation number Nf expresses the test process of the last stage which acquires fail bit data. The defective inspection process and the test process are established as one process like the usual manufacturing process. The lot which is a batch results in completion in the wafer state by passing through the stroke from an operation number 1 to Nf.

[0024] Next, in the defective warning system 10 constituted like drawing 1 , the procedure in the case of warning of a defect by the manufacturing process of a semiconductor device is explained using the flow chart of drawing 3 .

[0025] If a manufacturing process reaches a defective inspection process (it is Yes at Step 101), defective test equipment 11 will inspect the defect on a wafer, and will acquire defective data (Step 102). The acquired defective data are sent to storage 13 through defective evaluation judging equipment 17, and are registered into a database. Moreover, defective position data are sent to test equipment 12 among the aforementioned defective data, and a defective factor is acquired from defective evaluation judging equipment 17 by making the factor classification of the defect by the operator with this test equipment 12 (Step 103). On the database of storage 13, the acquired defective factor is related with defective data, and is registered. In this way, whenever it reaches a defective inspection process, the above-mentioned processing is repeated and data are accumulated. Next, the defective evaluation parameter calculation means 172 returns to Step 101, when it judges whether the defective evaluation parameter is already registered (Step 104) and is not registered on the database. Moreover, when registered, it progresses to Step 114 mentioned later.

[0026] Now, if a manufacturing process reaches a test process (it is Yes at Step 105), circuit tester equipment 14 will acquire the fail bit data for every wafer (Step 106). This fail bit data is sent to poor classification equipment 15. Poor classification equipment 15 classifies a poor kind from the generating pattern of a fail bit, and acquires poor classification data (Step 107). Poor classification data are sent to defective evaluation judging equipment 17. The poor classification data relates with the corresponding defective data, and the poor classification data judging means 171 of defective evaluation judging equipment 17 registers it, when the poor position (Xj, Yj) included in poor classification data under the condition of the same product, the same lot, and the same wafer compares with the defective position (Xpi, Ypi) included in the already registered defective data and these are in agreement in the same position (Step 108).

[0027] Next, the defective evaluation parameter calculation means 172 judges whether the defective evaluation parameter is already registered on the database (Step 109). Here, when not registered, a defective position evaluation parameter, a defective size evaluation parameter, and a defective factor parameter are calculated for every product and process, respectively based on the aforementioned defective data, poor classification data, and a defective factor (Step 110), and it registers with a database (Step 111). Moreover, it judges whether when the defective evaluation parameter is registered at Step 109, there is any number of data more than the number of criteria (Step 112), and when it is not over the criterion, it progresses to Step 110. In addition, when the defective evaluation parameter is already registered, the data will be added and a new defective evaluation parameter will be re-calculated.

[0028] Thus, that it was made to perform only accumulation of data, without a defective evaluation parameter judging when 0 or the number of data does not reach the number of criteria has the comparatively high probability that a defect will occur in an early lot, and it is because it is not suitable for performing a practical judgment since there are few numbers, even if the lot ended to the last test process does not exist or exists.

[0029] Now, as for the defective evaluation parameter calculation means 172, in a certain case, the number of data re-calculates a defective position evaluation parameter, a defective size evaluation

parameter, and a defective factor parameter for every product and process more than the number of criteria at Step 112, respectively based on the aforementioned defective data, poor classification data, a defective factor, and each already registered defective evaluation parameter (Step 113). Next, the defective judging means 173 compares with each criterion each defective evaluation parameter calculated with the defective evaluation parameter calculation means 172, and it judges whether any one of the aforementioned parameters exceeded the criterion (Step 114). Here, when all do not exceed a criterion, the data of the re-calculated defective evaluation parameter are registered on a database (Step 115), and it returns to Step 101. Moreover, when exceeding at least one criterion, warning is emitted to an operator through alarm display equipment 16 (Step 116).

[0030] Next, operation and the contents of processing of each component which are collectively explained and shown in drawing 1 about the example of the processing mentioned above are further explained to a detail.

[0031] In drawing 2 , if the product A of lot ID=L1 reaches the defective inspection process of an operation number 3, in defective test equipment 11, inspection of a defect will be conducted about the wafer arbitrarily chosen by all the wafers or sampling which constitutes a lot, and the defective data about the number of defects, a defective position (Xpi, Ypi), and defective size (delta Xsi, delta Ysi) will be acquired.

[0032] The example of the defect generated on the wafer is shown in drawing 4 . Explanatory drawing and this drawing (b) showing the position of the defect which generated drawing 4 (a) on the wafer 201 are an enlarged view of a defect. In this example, as shown in drawing 4 (a), four defects of a defect 201-1 to 201-4 exist, and each coordinate position is expressed by the coordinate value on XY shaft. That is, a defective position is expressed with the coordinate value (Xpi, Ypi) of the point at the upper left of the rectangle field surrounding a defect as shown in drawing 4 (b), and defective size is expressed with the length (delta Xsi, delta Ysi) of the aforementioned rectangle field in every direction. These defective data are registered on a database by the data structure mentioned later.

[0033] Next, defective position data are sent to test equipment 12 from defective evaluation judging equipment 17. Here, the factor classification of the defect by the operator is performed based on the image data of test equipment, such as a review station or SEM. The defective factor acquired here is sent to storage 13 through defective evaluation judging equipment 17. A defective factor is a cause about the defect as which change is regarded physically and chemically as explained previously, for example, a crack and which five short factors are set up. The defective factor code (those without defective are also included) to 1-5 is given to these defective factors according to the classification, and it registers with the database of storage 13 by the code number. Same processing is carried out whenever the product A of lot ID=L1 reaches the defective inspection process of operation numbers 6 and 10.

[0034] Then, the defective evaluation parameter calculation means 172 judges whether the defective evaluation parameter is already registered on the database. Here, since it is registered in no cases of the lot of the beginning of the product, only accumulation of data is performed. Moreover, when the defective evaluation parameter is already registered, comparison with a criterion is performed in a defective judging means 173 to mention later.

[0035] Next, if the product A of lot ID=L1 reaches the test process of the operation number Nf of drawing 2 , the fail bit data for every wafer will be acquired by circuit tester equipment 14. The example of fail bit data is shown in drawing 5 . Explanatory drawing and this drawing (b) showing fail bit [by which drawing 5 (a) was detected on the same wafer as drawing 4 (a)] 301-1 - 301-3 position are an enlarged view of a fail bit 301-3. In addition, the number of defects and defective position of drawing 4 and drawing 5 are not necessarily in agreement. Even if this is detected as a defect by optical inspection, it may be satisfactory in electrical property, and it is because there may be a problem in electrical property in an optical inspection even if not detected as a defect.

[0036] Next, in poor classification equipment 15, a poor kind is classified from the generating pattern of a fail bit, and poor classification data are acquired. As a poor classification, six patterns without a poor block, a low defect, a poor column, a poor cross joint, a poor bit, and a defect are set up, for example. And the poor classification codes from one to 6 are attached according to a pattern, and it registers with

the database of storage 13 by the code number. Moreover, the poor position (Xj, Yj) expressed with the same system of coordinates as the defective position (Xpi, Ypi) of defective data is added to poor classification data. This poor position is expressed by the coordinate value on XY shaft, as shown in drawing 5 (a). As a poor position (Xj, Yj) is shown in drawing 5 (b), it is expressed with the coordinate value (X1, Y1 ... X2, Y2 ...) of the point at the upper left of a fail bit, and size is expressed with the length of the aforementioned rectangle field in every direction. The poor classification data obtained here are sent to defective evaluation judging equipment 17.

[0037] With the poor classification data judging means 171 of defective evaluation judging equipment 17 The poor position included in the aforementioned poor classification data under the condition of the same product, the same lot, and the same wafer (Xj, Yj), When comparison with the defective position (Xpi, Ypi) included in the already registered defective data is performed and these are in agreement in the same position, the poor classification code contained in the poor classification data relates with the corresponding defective data, and is registered. Drawing 6 is explanatory drawing showing the data structure of the various data registered on the database, and shows the data structure at the time of a poor classification code (1-6) being registered into the item of a "poor classification." In addition, the poor classification code is not registered about the defect a poor position and whose defective position do not correspond in the same position. In addition, transcriptions, such as a poor position of a fail bit shown in the defective position shown in drawing 4 , size, and drawing 5 and size, are not limited to the example of this operation gestalt.

[0038] Next, in the defective evaluation parameter calculation means 172, it judges whether the defective evaluation parameter is already registered on the database. here, the defective evaluation parameter is already registered more than the number of criteria -- a thing is carried out In this case, with the defective evaluation parameter calculation means 172, a defective position evaluation parameter, a defective size evaluation parameter, and a defective factor parameter are calculated for every product and process, respectively based on the aforementioned defective data, poor classification data, a defective factor, and the already registered defective evaluation parameter. Here, a defective position evaluation parameter totals at a product and a process paying attention to the defect which exists in the same position as the defective position where the poor classification code is attached among defective data, and calculates the incidence rate of the defect in the same position. For example, in Product A and a process 3, when the defect which exists in the same position as the defective position where the poor classification code is attached is found in six sheets of ten wafers, the value of a defective position evaluation parameter is set to 60 (%). In addition, this value is added and calculated when there is an already registered defective position evaluation parameter. Similarly, a defective size evaluation parameter is the same position, and calculates the incidence rate of the defect of the same size, and defective factor parameters are the same position and the same size, and calculate the incidence rate of the defect of the same defective factor.

[0039] In addition, as the flow chart of drawing 3 also explained, when it has judged whether the defective evaluation parameter is already registered on the database, or the defective evaluation parameter calculation means 172 has the number of data more than the number of criteria, before calculating a defective evaluation parameter, and is not registered or there is no number of data more than the number of criteria, after calculating a defective evaluation parameter, it registers with a database as it is. A defective evaluation parameter is registered into a file different from the defective data of drawing 6 at this time.

[0040] Next, the defective judging means 173 compares with each criterion each parameter calculated with the defective evaluation parameter. For example, about a defective position evaluation parameter (Pp) defective size evaluation parameter (Ps) and a defective factor parameter (Pdt), supposing it sets up criteria p50, s50, and dt50, respectively Defective position evaluation parameter (Pp) >p50 defective size evaluation parameter (Ps) >s50 defective factor parameter (Pdt) > It compares like dt50. When exceeding at least one criterion, in alarm display equipment 16, generating of a defect is displayed by the message, or alarm is sounded and warning is emitted.

[0041] According to the defective warning system mentioned above, in an early lot, even if the defect

exists, since 0 or the number of data has not reached the number of criteria, a defective evaluation parameter does not result in the aforementioned judgment in any of a defective inspection process and a test process, and an alarm is not generated. And a consecutive lot flows a line top, and if a defective evaluation parameter becomes the stage which exists at least one in a defective inspection process, the judgment by the defective judging means 173 is performed, and when the number of the parameters with which the incidence rate of a defect exceeds a criterion is also one, warning will be emitted for every defective inspection process. Moreover, in a test process, when the number of data of the defective evaluation parameter registered on the database has reached the number of criteria, the judgment by the defective judging means 173 is performed, and when the number of the parameters with which the incidence rate of a defect exceeds a criterion is also one, warning is emitted.

[0042] Thus, possibility that the same defect will occur is high, and since a useless man day increases when a line top is passed as it was, it is considered by the lot which continues behind when warning is emitted for the yield to fall. Therefore, an operator can attain improvement in early of the yield, and stabilization of a good yield state by stopping a line in this stage or coping with stopping the continuation of manufacture of the following lot etc.

[0043] In addition, since it also becomes also becoming emitting warning even if the value of the calculated defective evaluation parameter is the same, and not emitting depending on the level of a criterion, the level of a criterion is set up with a service condition, a work environment, etc. For example, in the pilot-run stage of a production line, a criterion is lowered, and a different criterion is set up as a criterion is raised in the stage included in full-scale production organization. When a defect by which warning is emitted generally occurs, it is necessary to stop a line immediately. However, the feature is for this system to emit warning as a judgment material for an operator making a suitable judgment, when a defect with a possibility of a line not being stopped automatically but causing the fall of the yield occurs. Therefore, when any one of the calculated defective evaluation parameters exceeds a criterion as an application, the lot which has generated the defect is removed from a line, or the processing equipment of the process which the defect generated is specified, and you may make it stop the equipment by analyzing the data accumulated at the database.

[0044] Moreover, you may make it specify the number of wafers on the number of data and concrete target which use it in case it not only compares with a criterion, but a parameter is computed in the judgment of a defective evaluation parameter. The data of this of the same position are because the reliability of a defective evaluation parameter becomes low and it may become the cause of incorrect warning depending on the number of wafers, when there are few wafers. Moreover, the parameter resulting from both a defective position besides a defective position, size, and a defective factor and defective size can also be set to a defective evaluation parameter. Furthermore, let investigation of the cause of defective generating be an easy thing by analyzing the judgment result in defective evaluation judging equipment 17, a defective factor, a poor classification, etc.

[0045]

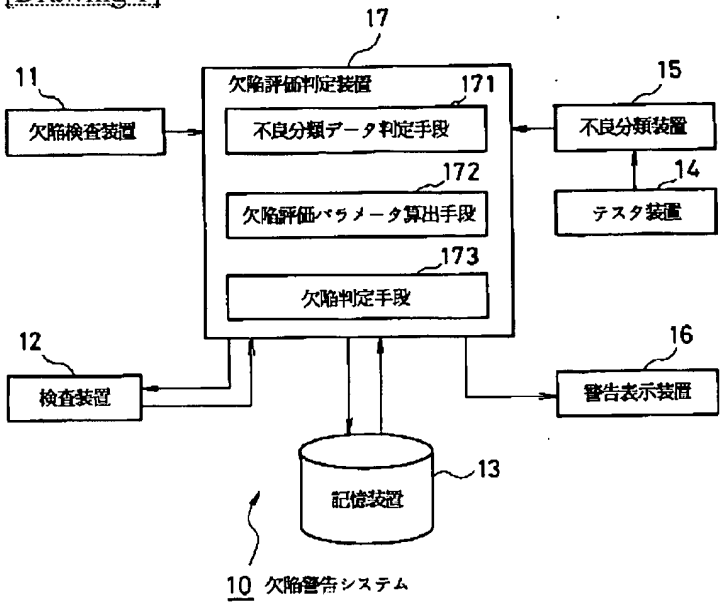
[Effect of the Invention] When a defect which causes the fall of the yield occurs according to the defective warning method and the defective warning system concerning this invention since warning was emitted when the incidence rate of a defect was calculated based on the defective data and the poor classification data which were detected from the inspected object and the incidence rate of this defect exceeded a criterion as explained above, an operator can implement a subsequent cure quickly and correctly.

[0046] That is, in the defective warning method and defective warning system concerning this invention, since warning was emitted as a judgment material for an operator making a suitable judgment when a defect which causes the fall of the yield occurred, artificial judgment performs defective analysis like before, and it compares, and individual differences arise in a judgment result, or time does not have this thing in it. Therefore, producing un-arranging [of the futility of the man day by the lot which does not become a product flowing a line top, and a lot with the same defect being generated one after another] is lost, and the fall of the yield of the product by the delay of a cure can be avoided.

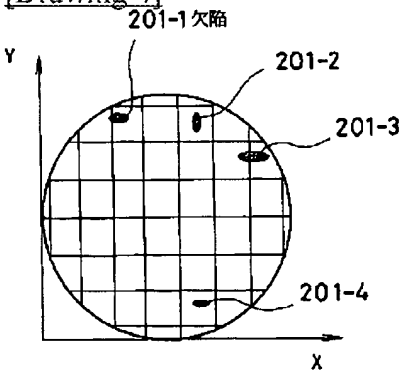
[Translation done.]

DRAWINGS

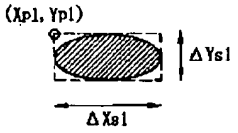
[Drawing 1]



[Drawing 4]

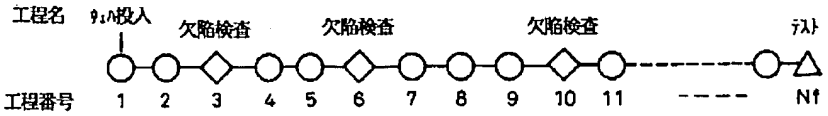


(a)

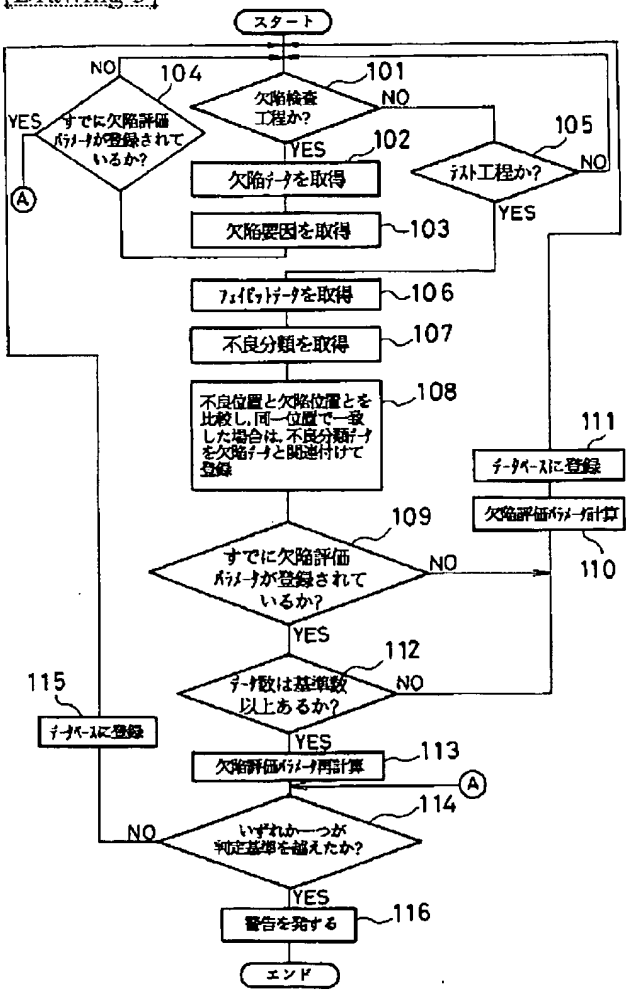


(b)

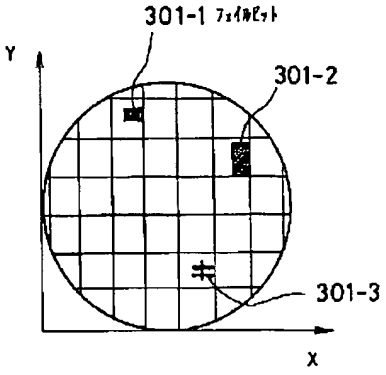
[Drawing 2]



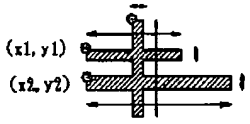
[Drawing 3]



[Drawing 5]



(a)



(b)

[Drawing 6]

欠陥位置	欠陥サイズ	欠陥要因	不良分類	ロットID	ウェハID	製品名	工程番号	欠陥数
Xp1, Yp1	ΔXs1, ΔYs1	1	2	L1	W1	A	3	4
Xp2, Yp2	ΔXs2, ΔYs2	5	5	L1	W1	A	3	4
Xp3, Yp3	ΔXs3, ΔYs3	4	3	L1	W1	A	6	4
Xp4, Yp4	ΔXs4, ΔYs4	1		L1	W1	A	6	6
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮

[Translation done.]